

to the base, thin, glabrous, paler beneath; inflorescence terminal, cymose-paniculate, long-pedunculate, the panicles 4-6 cm. broad, broader than long, many-flowered, open, the branches slender, glabrous, divaricate or ascending at a wide angle, the bracts and bractlets minute; flowers sessile or short-pedicellate, in few-flowered cymes; calyx glabrous, 1 mm. long, shallowly 5-dentate; corolla greenish white, glabrous, 2.5-3 mm. long, the lobes nearly as long as the tube.

Type in the U. S. National Herbarium, no. 1,153,182, collected in moist forest near Orosi, Province of Cartago, Costa Rica, March 30, 1924, by Paul C. Standley (no. 39803). The following specimens also represent the species:

COSTA RICA: Orosi, *Standley* 39766, 39768, 39861. El Muñeco, south of Navarro, Province of Cartago, alt. about 1,400 m., *Standley* 33444.

P. orosiana is well marked by the practically sessile leaves.

Psychotria siggersiana Standl., sp. nov.

Shrub, 1-1.8 m. high, the stems simple, green, sparsely villous-hirsute or glabrous; stipules green, about 7 mm. long, rounded-deltoid, usually glabrous, finally deciduous from the persistent sheath; petioles 4.5-9 cm. long, hirsute or glabrate; leaf blades elliptic or broadly elliptic, 20-34 cm. long, 11-17 cm. wide, abruptly short-acuminate at apex or rounded and short-acuminate, acute at base, somewhat fleshy, copiously villous-hirsute on both surfaces, or sometimes glabrate above; inflorescence axillary, cymose-paniculate, many-flowered, ample, sometimes 20 cm. broad, the peduncles shorter than the cymes, the branches villous-hirsute; flowers sessile, usually densely clustered, the bracts large, green, villous, equaling or exceeding the flowers; calyx about 1 mm. long, sparsely short-villous, the 5 lobes deltoid-ovate; corolla 3 mm. long, greenish white, salverform, sparsely short-villous outside; fruit subglobose, red, 5-6 mm. long, the 2 stones deeply concave on the inner face.

Type in the U. S. National Herbarium, no. 1,153,058, collected in wet forest near Guápiles, Province of Limén, Costa Rica, altitude about 500 meters, March 12-13, 1924, by Paul C. Standley (no. 37210). The following additional specimens belong to this species:

COSTA RICA: Guápiles, *Standley* 37268, 37047, 37228, 37206. Tuis, alt. 650 m., *Tonduz*, 11465.

Related to *P. tonduzii*, but differing conspicuously in the broad leaves with copious pubescence. The species is named for Mr. Paul V. Siggers, of the United Fruit Company, who accompanied me upon two very agreeable and profitable collecting excursions to the Atlantic lowlands of Costa Rica.

BOTANY.—*New tropical American species of Urticaceae.*¹ ELLSWORTH P. KILLIP, U. S. National Museum.

Most of the species described in this paper belong to the genus *Pilea* and are based upon material collected in Central America. One new species of this genus from Mexico and five from South America, as well as a new *Pouzolzia*, are included. A species is transferred from the genus *Urera* to *Pilea*.

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Pilea tridentata Killip, sp. nov.

Herbaceous or suffrutescent, 40 cm. high or more, glabrous throughout; stem woody below, sulcate; stipules deltoid-ovate, 0.5 mm. long, deciduous; leaves penninerved with 6 to 8 pairs of nerves, opposite, those of a node conspicuously unequal and dissimilar, the larger 5 to 8 mm. long, 3 to 4 mm. wide, oblong-spatulate, 3-toothed at apex (or the upper occasionally subentire), tapering to a petiole 1 to 1.5 mm. long, the margins subequal at base or the upper side shorter, the smaller leaves 3 to 4 mm. long, 2.5 mm. wide, ovate or suborbicular, obtuse, sessile, very unequal at the base, the upper side oblique, the lower side auriculate, the upper surface densely, the under surface sparsely, covered with narrowly fusiform cystoliths 0.4 to 0.5 mm. long; plants dioecious (or monoecious?); staminate cymes 2 or 3-flowered, the peduncles 2.5 mm. long, the pedicels 2 mm. long, the perianth globose, 1.5 mm. in diameter, the tips of the segments acute, 0.3 mm. long; pistillate cymes 3 or 4-flowered, the peduncles 1.5 mm. long; pistillate flowers whitish, the middle perianth-segment elongate, 1.2 mm. long, the lateral segments 0.5 mm. long; achenes narrowly oblong, 1 mm. long, 0.6 mm. broad, minutely roughened.

Type in the U. S. National Herbarium, no. 799,669, collected near Cobán, Department of Alta Verapaz, Guatemala, 1,500 meters altitude, November 7, 1907, by H. von Türckheim (no. 2011). Türckheim's 2491, from the same locality, is also this species.

Pilea tridentata resembles *P. pleuroneura* Donn. Smith, but in that species the leaves are crenate to the middle, symmetrical at base, and proportionately longer.

Pilea argentea Killip, sp. nov.

Plant herbaceous, glabrous throughout; stems erect, up to 35 cm. (or more?) high, apparently simple, succulent, copiously covered with linear cystoliths; stipules broadly triangular-ovate, barely 1 mm. long, soon deciduous; leaves of a pair nearly equal, oblong, up to 8 cm. long, 3 cm. wide, acuminate, obtusish at apex, subauriculate and often slightly oblique at base, 3-nerved at base (nerves pale beneath, the lateral nerves reaching apex of blade), penniveined along midnerve, sessile or on petioles not more than 1 cm. long, entire at margin, thick, the upper surface green, densely covered with linear, straight or curved, and punctiform cystoliths, the under surface silvery-lustrous, with very numerous elongate-linear cystoliths on the nerves and conspicuous, elevated, curved or straight, linear cystoliths elsewhere; plants apparently dioecious; staminate inflorescence in axillary panicles near end of plant, the flowers in subglobose culsters, the perianth about 0.5 mm. long, pale proximally; pistillate inflorescence in panicles at nodes of upper half of plant, the flowers in few-flowered, subcontiguous, small clusters, the segments orbicular, subequal; achenes suborbicular, about 0.5 mm. long, narrowly winged, the surface minutely rugulose.

Type in the herbarium of the New York Botanical Garden, collected in forest east of Neiva, Department of Huila, in the Cordillera Oriental, Colombia, altitude 1500 to 2000 meters, August 1-8, 1917, by H. H. Rusby and F. W. Pennell (no. 654). Another specimen (no. 938), collected at the same time, also belongs to this species.

Pilea argentea is related to *P. parietaria* (L.) Blume, a common species of

tropical America. It may be distinguished by the sessile, or nearly sessile, proportionately longer and thicker leaves, and its coarser, more erect habit.

Pilea chiriquina Killip, sp. nov.

Plant glabrous, suffrutescent; stem decumbent and rooting at the base, the branches erect, 35 to 60 cm. high, simple; stipules deciduous; leaves triplinerved to apex, crenate-serrate, dark green above, paler beneath, the cystoliths of upper surface fusiform, minute; leaves of a pair very unequal, the larger oblong-lanceolate or oblanceolate, 4 to 5 cm. long, 1.2 to 2 cm. wide, caudate-acuminate, subauriculate at base (lower margin slightly the longer), the petioles 3 to 4 mm. long, the smaller leaves ovate or ovate-lanceolate, 1 to 1.3 cm. long, 0.6 to 0.9 cm. wide, acute, unequally subcordate at base (lower margin conspicuously auriculate), the petioles 1 mm. long; flowers dioecious, the pistillate borne in a compact flat-topped cyme 9 to 11 mm. wide, the peduncle 8 to 10 mm. long, the divisions of the perianth subequal, 0.9 mm. long, 0.5 mm. wide, bearing linear cystoliths on the outer surface.

Type in the U. S. National Herbarium, no. 1,010,199, collected in the humid forest along the upper Caldera River, 8 miles north of El Boquete, Province of Chiriquí, Panama, altitude 1,650 meters, February 11, 1918, by E. P. Killip (no. 3546). Duplicates of this collection are in the herbarium of the Rochester Academy of Science.

This species is to be distinguished from *Pilea pansamalana* by the longer peduncles of the pistillate cymes, by the subauriculate, rather than cuneate, leaf-bases, and by its erect, not prostrate, habit.

Pilea caudata Killip, sp. nov.

Glabrous throughout; stem erect, simple; stipules deltoid, 0.7 mm. long, 0.8 mm. broad, acute; leaves thickish, triplinerved, dark green above, paler beneath, bearing densely on the upper surface, sparsely on the lower surface, punctiform cystoliths, reticulate-veined (nerves and veins impressed and conspicuous beneath), cuneate at base, those of a pair conspicuously unequal, the larger lanceolate-elliptic, 10 to 15 cm. long, 2 to 4 cm. wide, caudate-acuminate (tips 2 to 3 cm. long), denticulate in upper third, the teeth 3 to 6 on a side, acute, 0.4 mm. long or less, the petiole 1 to 2.5 cm. long, channeled, swollen at base, the smaller leaves narrowly lanceolate-elliptic, 3 cm. long, 0.8 to 1 cm. wide, acuminate, entire or obsoletely serrulate at apex, the petiole 2 to 3 mm. long; plants dioecious?; staminate flowers in dense, axillary glomerules, globose, 0.8 mm. in diameter, the tips of the segments 0.2 mm. long, acute; pistillate flowers not seen.

Type in the U. S. National Herbarium, no. 408318, collected at Secoyocté, near Finca Sepacuité, Department of Alta Verapaz, Guatemala, April 14, 1902, by O. F. Cook and R. F. Griggs (no. 609).

The texture and venation of the foliage of this species resemble that of *Pilea riparia*. There is, however, a much greater diversity between the size of the leaves of a pair than in the case of *P. riparia*. The larger leaves, moreover, are much longer, the tips are shallowly, but distinctly and sharply denticulate, the margin is not thickened, and the cystoliths are uniformly punctiform, not linear at the margin of the blade.

Pilea donnell-smithiana Killip, sp. nov.

Erect herb, about 1 meter high, glabrous throughout; stem simple or few-branched near base; stipules minute, triangular-ovate, soon deciduous; leaves ovate or elliptic, crenate-serrate nearly to base, 3-nerved or subtriplicate (nerves extending to apex of blade), rounded or subauriculate and often oblique at base, faintly marked with minute linear cystoliths on both surfaces; leaves of a pair conspicuously unequal, the larger 10 to 20 cm. long, 4 to 7 cm. wide, caudate-acuminate, their petioles 1.5 to 2.5 cm. long, the smaller leaves 1.5 to 3 cm. long, 1 to 1.5 cm. wide, acute, their petioles 0.3 to 0.5 cm. long; plants dioecious; staminate flowers borne in subglobose, distinct, usually pedicellate clusters in small axillary panicles 2 cm. long, or less, the perianth segments 0.5 mm. long; pistillate flowers in few-flowered subglobose heads about 5 mm. wide, the peduncles 2 to 3 mm. long, the middle perianth segment twice as long as the outer segments; achenes ovate, about 2.5 mm. long (large for the genus), strongly flattened.

Type in the U. S. National Herbarium, no. 799,603 (staminate), collected at La Palma, Province of San José, Costa Rica, altitude 1460 meters, September, 1898, by A. Tonduz (Herb. Inst. Phys.-geogr. Costa Rica no. 12,655; J. D. Smith no. 7467, distributed as *P. costaricensis*).

Additional specimens examined:

COSTA RICA: La Hondura, Prov. San José, 1300–1700 meters, *Standley* 37841, 37866, 37899.

PANAMA: Along Holcomb's trail, about 10 miles above El Boquete, Prov. Chiriquí, 1700 meters, *Killip* 3562.

The description of the pistillate inflorescence is based on *Standley's* 37841 (U. S. N. H. 1,229,574).

From *P. costaricensis* Donn. Sm. this new species differs in both staminate and pistillate inflorescence. The staminate flowers are in small distinct glomerules on short few-branched panicles; in *P. costaricensis* they are in very dense, nearly sessile cymes. The pistillate flowers are in globose, few-flowered heads, while in *P. costaricensis* they are in compact sessile cymes. The achenes of *P. donnell-smithiana* are fully twice as large as those of its near relative.

It is quite fitting that a species of *Pilea* should be named for Captain J. Donnell Smith, who has been one of the few botanists in the last half-century to study critically this interesting genus.

Pilea cornmanae Killip, sp. nov.

Plant herbaceous, erect, up to 60 cm. high, the stem branched, yellowish green, densely covered with elevated linear cystoliths, glabrous; stipules orbicular or ovate, about 5 mm. long, 3.5 mm. wide, obtuse, persistent, yellowish green, mottled with red; leaves coarsely serrate (teeth 2 to 3 mm. long, acute), dark green above, paler beneath, densely covered on both surfaces with linear cystoliths about 0.3 mm. long, occasionally sparsely strigillose above with hyaline hairs; leaves of a pair unequal, the larger ovate-lanceolate, 3 to 7 cm. long, 1.5 to 3 cm. wide, acuminate at apex, acute and often oblique at base, the petioles 1.5 to 4 cm. long, the smaller leaves broadly ovate or suborbicular, 1.5 to 2 cm. long, 1 to 1.5 cm. wide, acute at apex, subrotund and oblique at base, the petioles 4 to 5 mm. long; plants monoecious (or dioecious), the heads unisexual, the staminate and pistillate often borne at the same axil; staminate flowers densely clustered in globose heads 9 to 10 mm. in diameter, the peduncle slender, 1 to 3 cm. long, the perianth globose

or subturbinate, 2 mm. wide, the segments long-caudate, erect; pistillate flowers loosely clustered in subglobose heads 4 to 5 mm. in diameter, borne on peduncles 5 to 7 mm. long, the perianth segments subequal; achenes broadly ovate or suborbicular, about 1 mm. long.

Type in the U. S. National Herbarium, no. 1,010,196, collected in dense forest along the Río Caldera, 7 miles north of El Boquete, Province of Chiriquí, Panama, altitude 1650 meters, February 11, 1918, by Mrs. L. R. Cornman (Killip 3543). A duplicate of the type is in the herbarium of the Rochester Academy of Science.

Additional specimens examined:

COSTA RICA: La Hondura, Prov. San José, 1300–1700 meters, *Standley* 37779, 37822.

Because of the striking differences in size and shape of the leaves at each node this species should probably be placed in Weddell's section *Heterophyllae*. In general appearance, in the texture of the stem and leaves, in the large persistent stipules, the cystoliths, and the peculiar hyaline hairs on the upper leaf-surfaces, it bears a close resemblance to *P. auriculata* Liebm., a species of the group *Pubescentes Longipedunculatae*. The elongate segments of the staminate flowers and the differently shaped leaves clearly distinguish it, however, from *P. auriculata*.

Pilea rusbyi (Britton) Killip, comb. nov.

Urera rusbyi Britton, Bull. Torrey Club 28: 310. 1901.

Pistillate plants of this species in the Buchtien Herbarium, recently acquired by the National Museum, show that it is of the genus *Pilea* rather than *Urera*, and is related to *P. anomala* Wedd. Because of this additional material it seems advisable to amplify the earlier description.

Stipules ovate, 1 to 2 mm. long, acutish, connate; petioles up to 6 cm. long; leaves abruptly acuminate (acumen up to 1.5 cm. long), often oblique at base, 3-nerved or subtriplinerved, above bearing numerous punctiform cystoliths, nearly destitute of cystoliths beneath but punctate with inconspicuous dark dots; plants dioecious; panicles much branched, wide-spreading, 20 (or up to 30?) cm. wide; staminate inflorescences on peduncles up to 4 cm. long, the perianth segments ovate, 1 mm. long; pistillate inflorescences on peduncles up to 7 cm. long, longer than the accompanying petiole, the perianth segments ovate, subequal or the lateral two-thirds as long as the middle segment, the achenes ovoid, 1 mm. long, 0.8 mm. wide, acutish.

Specimens examined:

BOLIVIA: Yungas, 1800 meters, *Rusby* 1774 (type collection of *Urera rusbyi*). Polo-Polo, near Coroico, North Yungas, 1100 meters, *Buchtien* 3754.

Pilea pauciserrata Killip, sp. nov.

Low slender herb, glabrous throughout, the stem repent, at length erect, about 15 cm. high, the internodes 1 to 2 cm. long; stipules ovate, 1 mm. long, obtuse; leaves narrowly obovate, 6 to 20 mm. long, 2 to 5 mm. wide, cuneate-attenuate at base, coarsely serrate above middle (serrations 4 or 5 on each side, triangular, up to 1.5 mm. long, acute, the upper margin of each serration at right-angles to the midrib), entire at base, penninerved (lateral nerves faint), membranous, sessile or short-petioled (petioles up to 2 mm. long), bearing on upper surface, especially near margin, a few small, fusiform or

linear cystoliths, on under surface a few punctiform cystoliths; plants apparently dioecious; staminate flowers 3 mm. wide, purple above, pale at base, sessile or short-pedicel in few-flowered pedunculate heads (peduncles slender, up to 1.5 cm. long), the perianth segments ovate, 1 mm. long, mucronulate, bearing linear cystoliths on outside.

Type in the U. S. National Herbarium, no. 1,157,852, collected at Unduavi, North Yungas, Bolivia, altitude 3400 meters, November, 1910, by O. Buch-tien (no. 2811).

This species resembles *P. serrulata* (Sw.) Wedd., having leaves of much the same shape. The leaves, however, are of thinner texture, and the cystolithic marking is wholly dissimilar. *Pilea pauciserrata* is distinctly herbaceous, having none of the shrubby habit of its relative.

***Pilea gracilipes* Killip, sp. nov.**

Plant herbaceous, glabrous throughout; stem repent, the branches erect, simple, 8 to 40 cm. high; stipules minute, triangular-ovate, 1.2 to 1.5 mm. long, acute, deciduous; leaves ovate-lanceolate or elliptic, 1 to 8 cm. long, 0.7 to 2.5 cm. wide, acuminate at apex, rounded or acutish at base, crenate-serrate (teeth 0.5 to 1 mm. long, acute or often mucronulate), 3-nerved (nerves extending to upper third of blade), bright green above, paler and often glaucescent beneath, both surfaces bearing numerous faint linear cystoliths; leaves of a pair similar in form, subequal in size or one three-quarters as long as the other, the petioles of the smaller up to 1.5 cm. long, those of the larger about twice as long; plants monoecious or dioecious, the staminate and pistillate inflorescences often arising at the same axil; staminate flowers in globose, 12 to 20-flowered heads 5 to 7 mm. wide, the peduncles filiform, 2 to 3.5 cm. long, the perianth marked with linear cystoliths on outside, proximally yellowish, distally dark green, the tips of the segments barely 0.1 mm.; pistillate flowers in loose glomerules in interrupted spikes or racemose-paniculate, the peduncles filiform or linear, 2 to 5 cm. long, usually much exceeding the petioles, the middle perianth segment linear-oblong, 1 mm. long, eucullate, the lateral segments suborbicular, about half as long; achenes lance-ovate, 1 to 1.2 mm. long, 1 mm. wide at base, acute.

Type in the U. S. National Herbarium, no. 675,809, collected on a wet brushy slope in the humid forest at Los Sigüas Camp, southern slope of Cerro de Horqueta, Province of Chiriquí, Panama, altitude about 1700 meters, March, 1911, by W. R. Maxon (no. 5426).

The following specimens, all from Costa Rica, at altitudes varying from 1200 to 2500 meters, have also been examined:

Copey, *Tonduz* 11805, 11925. Tablazo, *Tonduz* 7927; Coliblaneo, *Maxon* 309. Santa Clara de Cartago, *Maxon* 8165. La Estrella, Prov. Cartago, *Cooper* 384 (J. D. Smith 5950); *Standley* 39091, 39099, 39234, 39454. Cerro de la Carpintera, Prov. Cartago, *Standley* 34493, 35524. Volcán de Poás, *Standley* 34630; *Tonduz* 10790. Las Nubes, Prov. San José, *Standley* 38540, 38541, 38824.

Much of the material here cited was distributed as *P. auriculata*, a species with smaller rotund-rhombic leaves, pilose with hyaline hairs on the upper surface, large persistent stipules, and the middle segments of the pistillate flowers auriculate. *Pilea gracilipes* more closely resembles *P. dauciodora*, but is at once distinguished by larger, differently-shaped leaves and long-peduncled staminate flower-clusters.

Pilea angustifolia Killip, sp. nov.

Plant herbaceous, glabrous throughout; stem repent at base, erect, simple or few-branched, 40 to 45 cm. high; stipules deltoid, 0.8 mm. long, 1 mm. wide at base, deciduous; petioles enlarged at base, those of a pair usually unequal, the longer 4 to 8 mm. long, the shorter 2 to 3.5 mm. long; leaves narrowly lanceolate, 4 to 10 cm. long, 0.8 to 1.2 cm. wide, those of a pair similar in shape, subequal in size (or the one four-fifths as long as the other), triplinerved (nerves extending to upper third of blade), acuminate at apex, narrowed to a cuneate or subcordate base, serrulate (teeth acute, often mucronulate, 1 mm. long), bearing on both surfaces minute linear cystoliths; plants monoecious; staminate flowers densely congested in globose heads 0.6 to 1 cm. in diameter, the peduncles very slender, filiform, 3 to 4 cm. long, the pedicels 1 to 1.5 mm. long, the perianth segments with tips about 0.4 mm. long; pistillate flowers congested in sessile cymes 3 to 5 mm. wide, the middle segment linear-oblong, about 1 mm. long, the lateral segments ovate, 0.6 mm. long; achenes oblong, 1 mm. long, 0.7 mm. wide, acute, smooth.

Type in the U. S. National Herbarium, no. 473,969, collected at Juan Viñas, Reventazón Valley, Costa Rica, altitude 1000 meters, April 21, 1903, by O. F. Cook and C. B. Doyle (no. 181).

Related to *P. gracilipes*, this differs in its proportionately narrower leaves, nearly sessile pistillate cymes, and in the unusually slender peduncles of the large staminate heads.

Pilea chiapensis Killip, sp. nov.

Plant herbaceous, 30 cm. high or more, glabrous throughout; stem angulate, grooved, slightly flexuous; stipules early deciduous; leaves of a pair very unequal and dissimilar, the larger oblanceolate or oblong (upper often falcate), 7 to 11 cm. long, 2 to 2.5 cm. wide, acuminate at apex (acumen up to 2 cm. long), narrowed to an oblique base, remotely and irregularly serrulate along upper fourth of margin (teeth obtuse or acutish, somewhat callous-thickened), otherwise entire, 3-nerved to apex of blade, the petioles 3 to 5 mm. long, the smaller leaves ovate or ovate-lanceolate, 1.5 to 2.5 cm. long, 0.5 to 1 cm. wide, acuminate or acute at apex, narrowed at base, subsessile or with petioles up to 2 mm. long, 3-nerved to apex, entire or crenate-serrulate at apex, both kinds of leaves faintly marked with linear and punctiform cystoliths on upper surface, destitute of cystoliths but sparsely black-punctate on under surface; staminate cymes subsessile, densely flowered, 5 to 7 mm. wide, the flowers on pedicels about 2.5 mm. long, the perianth globose, 2 mm. wide, the teeth minute, barely 0.3 mm. long; pistillate cymes subsessile, 5 mm. long, the flowers sessile, the segments unequal; achenes ovate, 0.5 mm. long.

Type in the herbarium of the Academy of Natural Sciences, Philadelphia, collected at the junction of the Teapa and Amatán rivers, Chiapas, Mexico, August 6, 1890, by J. N. Rivirosa (no. 938).

This species should be placed among the *Heterophyllae*, though it is quite unlike any other species of that section. In many respects it resembles *P. mexicana* Liebm., of the section *Glabratae Brevipedunculatae*, which, however, has the opposite leaves equal.

Pilea pallida Killip, sp. nov.

Plant herbaceous, glabrous throughout, or the nerves of the very young leaves pubescent beneath; stem simple, 30 cm. high or more, stipules lanceolate, 3 mm. long 1.5 mm. wide, acute, densely striate without with linear

cystoliths; petioles 1.5 to 4 cm. long, those of a pair subequal; leaves elliptic-lanceolate, 8 to 12 cm. long, 3 to 4 cm. wide, caudate-acuminate (tip up to 2.5 cm. long), tapering to petiole, triplinerved to base of tip, serrate (teeth obtuse, often mucronulate, 2 to 4 mm. long), densely covered with fusiform and punctiform cystoliths, dark green above, paler, slightly silvery-lustrous beneath; plants dioecious; staminate flowers densely congested in sessile subglobose clusters 3 to 4 mm. wide, the perianth globose, the tips about 0.4 mm. long; pistillate flowers in much-branched flat-topped cymes, shorter than the petioles, about 1 cm. long, 1.2 cm. wide, in the axils of the upper leaves, the branches of the inflorescence and the outside of the perianth densely striate with linear cystoliths, the middle perianth segment linear, 1 mm. long, obtuse, the lateral segments ovate, 0.2 mm. long, acute, scariose at margin; achenes ovoid, about 1 mm. long, 0.8 mm. wide, acute, wing-margined, the surface black, minutely papillose.

Type in the U. S. National Herbarium, no. 1,036,444, collected at Sibubi Falls, Sixaola Valley, Panama, June 6, 1918, by W. W. and H. E. Rowlee (no. 376).

This species differs from *P. quichensis* Donn. Sm., to which it is clearly allied, in the shape, texture, and particularly the cystolithic marking of the leaves.

Pilea lippoides Killip, sp. nov.

Plant apparently suffrutescent, glabrous throughout, the stem branched, marked, especially at nodes, with linear cystoliths; stipules oblong-lanceolate, about 3 mm. long, 1.5 mm. wide, bearing elongate linear cystoliths, at length deciduous; petioles filiform, those of a pair unequal, the longer 3 to 4 cm. long, the opposite ones about half as long; leaves of a node essentially equal and similar, ovate-elliptic, 2.5 to 6 cm. long, 1.5 to 2.5 cm. wide, acuminate at apex (acumen about 5 mm. long), tapering to petiole, coarsely crenate-serrate to base (teeth subimbricate, mucronulate), penninerved (lateral nerves 5 to 10 pairs, impressed above, conspicuous beneath), the upper surface dark green, with numerous short linear cystoliths, the under surface paler, with linear cystoliths on the nerves and veins and punctiform cystoliths elsewhere; plants monoecious; staminate flowers in dense globose heads borne singly in the axils of the upper leaves on slender peduncles 1.5 to 2 cm. long, each head subtended by an involucre of 8 bracts, the outer 4 orbicular, about 6 mm. in diameter, the inner 4 oblong, about 4 mm. long, 2.5 mm. wide, obtuse, the bracts of the same texture and cystolithic marking as the stipules, and completely enveloping the flowers before anthesis; staminate perianth segments 3, about 4 mm. long, with long linear tips; pistillate flowers in small, loosely about 10-flowered, subglobose clusters on peduncles 5 to 10 mm. long in the axils of the lower leaves, the perianth segments subequal, triangular-ovate, about 0.8 mm. long; achenes suborbicular, 1.5 mm. long, smooth.

Type in the U. S. National Herbarium, no. 531,410, collected near Río Flautas, Río Paez Valley, Tierra Adentro, Department of Huila, in the Cordillera Central, Colombia, altitude 2900 meters, January 26, 1906, by H. Pittier (no. 1216).

This species is remarkable for the conspicuous involucre subtending the staminate inflorescence, the general aspect of the plant strongly suggesting *Lippia*. In Weddell's monograph² of the family it would come nearest *P.*

² DC. Prodr. 16: 144.

serratifolia Wedd., an Ecuadorean species which, from description, also has a conspicuous involucre but which differs in venation and cystolithic marking of the leaves as well as in the shape of the staminate perianth segments.

Pilea buchtienii Killip, sp. nov.

Succulent herb, glabrous throughout, the stem at first repent, at length erect, about 20 cm. high, the internodes 3 to 6 cm. long; stipules ovate, 2 mm. long, 1 mm. wide, obtuse, soon deciduous; petioles 1 to 3.5 cm. long, succulent, canalliculate; leaves of a node similar and equal, ovate-elliptic, 8 to 12 cm. long, 3 to 6 cm. wide, acuminate (acumen up to 1.2 cm. long), tapering at base to petiole, doubly crenate-serrate, entire at base, triplinerved (nerves reaching to base of acumen), reticulate-veined (nerves and veins conspicuous beneath), the upper surface dark green, bearing numerous punctiform and minute fusiform cystoliths, the under surface destitute of cystoliths, punctate with numerous spots scattered among the nerves; plants monoecious, the staminate and pistillate flowers borne in glomerules in separate few-branched panicles often at the same node. the peduncles of both inflorescences subequal, 1.5 to 2 cm. long, slightly shorter than the subtending petioles; perianth segments of staminate flowers oblong, 1.2 mm. long, obtuse, the stamens slightly longer; perianth segments of pistillate flowers ovate, subequal, about 0.5 mm. long, concave; achenes conical, 1.5 mm. long, 1 mm. wide, strongly flattened.

Type in the U. S. National Herbarium, no. 1,156,963, collected at An-tahuacana, Espíritu Santo, Bolivia, altitude 750 meters, June, 1909, by O. Buchtien (no. 4526).

Nearest to *P. marginata* Wedd., this species is distinguished by its proportionately wider leaves with margins doubly serrate, and by the longer peduncles. *Pilea marginata* is said to be dioecious, while *P. buchtienii* is monoecious. The foliage of this species, especially in the venation, resembles that of *P. rusbyi* (Britton) Killip, though the leaves are thicker and the margin differently cut. *Pilea rusbyi*, however, is dioecious, and the peduncles are much longer.

Pilea hitchcockii Killip, sp. nov.

Plant herbaceous, the stem repent below, erect, about 30 cm. high, slender, ferruginous-strigillose, especially above, leafy near summit, the internodes at middle and toward base 3 to 4 cm. long; stipules ovate-orbicular, 4 to 7 mm. long, 2 to 4 mm. wide, rounded or subtruncate at apex, sparingly pubescent, persistent; petioles up to 4 mm. long, strigillose; leaves of a node similar but often slightly unequal, narrowly elliptic, 2 to 7 cm. long, 0.7 to 1.5 cm. wide, acute or acuminate at apex, acute or rarely slightly rounded at base, coarsely crenate-serrate or often sinuate-serrate (teeth obtuse or acutish), penninerved (lateral nerves 12 to 15 on each side), the upper surface dark green and glabrous, faintly marked with numerous fine linear cystoliths, the under surface much paler, densely strigillose on the nerves, otherwise glabrous, densely covered with minute punctiform cystoliths; plants monoecious; the cymes unisexual (staminate at lower nodes, pistillate at upper), dichotomous, up to 4 cm. long (including peduncle), the flowers sessile or subsessile; perianth segments of staminate flowers ovate, 1.5 mm. long, acute, glabrous; perianth segments of pistillate flowers ovate-lanceolate, 0.5 mm. long, acute, the apex often reflexed; achenes broadly ovoid, 1 to 1.2 mm. long, the margin thickened.

Type in the U. S. National Herbarium, no. 1,195,706, collected on a tree stump, in the valley of the Pastaza River, between Baños and Cashurco, 8 hours east of Baños, Province of Tungurahua, Ecuador, altitude 1300 to 1800 meters, September 25, 1923, by A. S. Hitchcock (no. 21825).

This species, having much the general appearance of narrow-leaved forms of *Euphorbia heterophylla*, belongs with the long-peduncled, pubescent species of the section *Dentatae*, though it is apparently the only species with penninervation. The venation is similar to that of *P. fallax* Wedd., a species with dimorphic leaves, and of *P. abetiaefolia* Killip, a very distinct Colombian plant.

Pilea pittieri Killip, sp. nov.

Plant herbaceous, decumbent or erect, up to 40 cm. high, the stem simple or few-branched, glabrescent below, sparingly pubescent above, densely marked throughout with linear cystoliths; stipules linear-oblong, 5 to 6 mm. long, 2 mm. wide, obtuse, deciduous; petioles 1 to 5 cm. long, those of a pair subequal (or one 2 or 3 times as long as the other), pubescent; leaves ovate or ovate-lanceolate, 3 to 10 cm. long, 1.5 to 7 cm. wide (those of a pair similar but slightly unequal), long-acuminate at apex, rounded or subcordate at base, 3 (or occasionally 5)-nerved (inner lateral nerves three-fourths length of blade), reticulate, serrate or serrate-crenate nearly to base (teeth obtuse or acute, minutely undulate-crenulate), the upper surface dark green, glabrous, bearing numerous minute linear cystoliths, especially along the nerves, the under surface paler, densely pubescent on nerves and veins, punctate on veins, bearing less numerous similar cystoliths; plant monoecious (or occasionally dioecious?); staminate cymes solitary in the axils of the lower leaves or at the leafless nodes of the rooting portion of the stem, subsessile (or on peduncles up to 3 cm. long), pubescent, densely flowered, the perianth segments linear-spatulate, 2 to 3 mm. long, 1 to 1.2 mm. wide, striate on outside with linear cystoliths; pistillate spikes solitary in the axils of the upper leaves, 4 to 5 cm. long, the peduncles slender, glabrous, 2 to 4-forked, the flowers borne in subglobose clusters 3 to 4 mm. wide, the middle perianth segment 0.6 to 0.8 mm. long, cucullate, twice as long as the lateral segments; achenes ovate, 1 mm. long, 0.8 mm. wide, acute, flattened, unicostate at center of both faces.

Type in the U. S. National Herbarium, no. 1,080,422, collected along the Río de la Paz, Sarapiquí Valley, Costa Rica, altitude 1300 meters, May 5, 1901, by H. Pittier (Herb. Inst. Phys.-geogr. Costa Rica 14149).

Additional specimens examined:

Costa Rica: (Province Cartago) La Estrella, *Standley* 39204. Orosi, *Standley* 39730, 39760, 39811, 39862. El Muñeco, *Standley* 33943. (Province San José) La Hondura, *Standley* 37713.

This species is related to *P. acuminata* Liebm., a dioecious plant with staminate and pistillate inflorescences similar and having much larger leaves, and to *P. pubescens* Liebm., a species with androgynous spikes and with the upper leaf-surface strigillose.

Pilea standleyi Killip, sp. nov.

Plant herbaceous, the stem decumbent, at length ascending to about 20 cm., slender, pellucid, green, glabrescent below, pubescent above, particularly at the nodes; stipules suborbicular, 3 to 4 mm. long, rounded, persistent; petioles up to 3 cm. long, densely pubescent, those of a pair subequal; leaves

ovate-elliptic, 2 to 6 cm. long, 1.5 to 3 cm. wide, acute at apex, rounded or acutish at base, crenate-serrate nearly to base, 3-nerved (lateral nerves extending to upper fourth of blade), dark green and glabrous above, paler beneath, densely pubescent on the nerves, bearing numerous linear cystoliths on both surfaces; plants dioecious; peduncles of pistillate inflorescence up to 5 cm. long, in the axils of the upper leaves, slender, glabrous, dichotomous, the flowers borne in contiguous clusters at the ends of the branches, the perianth segments unequal, the middle segment about 0.7 mm. long, the lateral segments less than one-half as long, hyaline; achenes suborbicular, about 0.8 mm. long, narrowly wing-margined, not costate on faces.

Type in the U. S. National Herbarium, no. 1,229,585, collected at Las Nubes, Province of San José, Costa Rica, altitude 1500 to 1900 meters, March 20-22, 1924, by Paul C. Standley (no. 38697).

The principal character by which this species may be distinguished from *P. pittieri*, which it resembles in general appearance, is in the smaller, conspicuously wing-margined, ecostate achenes.

Pouzolzia phenacoides Killip, sp. nov.

Shrub 1 to 1.5 meters high, branched, the branches hirsutulous above, glabrate below; stipules lanceolate, 5 to 6 mm. long, acuminate, pilosulous on midrib without, soon deciduous; leaves ovate or ovate-lanceolate, 2 to 6 cm. long, 1.5 to 3 cm. wide, acuminate at apex, rounded at base, petiolate (petioles up to 1.5 cm. long, slender), coarsely dentate-serrate except in lower quarter, 3-nerved at base, sparsely strigillose above with stiff white hairs, appressed-pilosulous on the nerves beneath; plants monoecious, the flower clusters androgynous or unisexual; staminate flowers in small, axillary, 1 to 5-flowered clusters, short-pedicellate, the perianth 4-lobed, about 1.5 cm. long, pubescent without, slightly exceeded by the stamens; pistillate flowers 1 to 5, short-pedicellate or sessile, at base of staminate inflorescence, the perianth tubular, about 2 mm. long, contracted at the short 4-toothed beak, about 12-nerved, finely puberulous without; achenes ovoid, about 2 mm. long, dark brown, shining.

Type in the U. S. National Herbarium, no. 1,229,521, collected on the Cerro de Piedra Blanca, above Escasú, Province of San José, Costa Rica, January 31, 1924, by P. C. Standley (no. 32484). Standley's 34679, from La Ventolera, on the southern slope of the Volcán de Poás, altitude 1700 meters, is also this species.

This is apparently the only known American species of *Pouzolzia* with toothed leaves. The flowers are much like those of *P. occidentalis* (Liebm.) Wedd. The general appearance of the specimens suggests *Phenax hirtus* or *Phenax mexicanus*.